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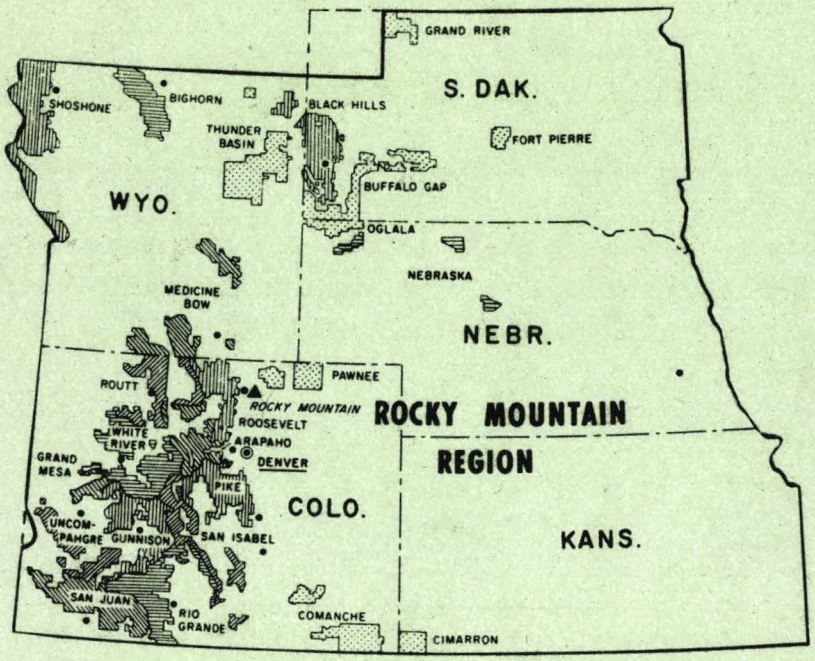
BIOLOGICAL EVALUATION

BLACK HILLS NATIONAL FOREST
AND ADJACENT STATE AND PRIVATE LANDS



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ROCKY MOUNTAIN STATION

BIOLOGICAL EVALUATION

BLACK HILLS NATIONAL FOREST
AND ADJACENT STATE AND PRIVATE LANDS

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BIOLOGICAL EVALUATION

BLACK HILLS NATIONAL FOREST
AND ADJACENT STATE AND PRIVATE LANDS

INTRODUCTION

During August 1974 and September of 1974 the mountain pine beetle infested and will eventually kill in excess of 470,000 merchantable sized ponderosa pine trees in the Black Hills of South Dakota and Wyoming. More than 192,000 of these trees have already been sold. Additional trees will be sold as market conditions allow. Alternate suppression methods are recommended for those trees in areas where the beetles have been suppressed by logging and in areas of high value.

METHODS

This evaluation is based on brood count data, buildup ratios and an aerial survey. Brood counts were taken in July by randomly selecting pockets of 1973 beetle killed trees. A 6 x 6 inch (0.25 ft.^{2}) bark sample was taken from the north and south side of each tree at breast height. The number of live brood was then compared to Knight's (1960)[1/] sample system to determine a general population trend for 1974.

Buildup ratios were measured by running 1/2 chain wide cruise lines in areas of known losses. All of the 1973 and 1974 infested trees were counted within each cruise line. Cruise lines were 5 chains apart and a mile long. The general areas of the cruise lines were predetermined after consultations with Black Hills personnel.

An aerial survey of the Black Hills was made in August, 1974. Only the 1973 infested trees occurring in groups were counted.

An estimate of the 1974 infested trees was made by multiplying the buildup ratio by the number of 1973 infested trees from the aerial survey for each of the four areas.

1/ Knight, F. B. 1960. Sequential sampling of Black Hills beetle populations. Rocky Mountain Forest and Range Experiment Station, Research Note #48, 8 pp.

RESULTS AND DISCUSSION

The results of the 1974 field work determined that tree losses in the Black Hills will continue to be high in 1975. Brood counts from the 1973 infested trees had high brood production and survival (Table 1). Buildup ratios in three of the four areas were greater than 1:1 (Table 2).

Tree losses for those trees infested in 1974 (visually dead in 1975) is in excess of 470,000 trees. The buildup ratios, aerial survey data and projected 1974-1975 for each of the four areas represented in Figure 1 are summarized in Table 2. Losses continue to be heaviest in the Limestone area and Bearlodge Mountains.

Table 1.-- Results of bark sample brood counts from the north and south sides of 1973 infested trees.

Area	No. Trees Sampled	Aver. Brood/0.25 ft^2 of Bark	Infested Trend
1	115	11.7	Increasing
2	214	14.3	Increasing
3	120	12.0	Increasing
4	24	26.4	Increasing

Table 2.-- Results of buildup ratio cruises, aerial survey information and predicted number of 1974 infested trees.

Area	Acres Cruised	No. Infested Trees 1974	No. Infested Trees 1973	Buildup Ratio	No. Remaining 1973 Infested Trees	Estimated No. 1974 Infested Trees a/
1	64	493	276	1.8:1	56,000	100,800
2	78	1101	577	1.9:1	150,000	285,000
3	26	95	59	1.6:1	33,000	52,800
4	16	100	96	1.0:1	32,000	32,000
TOTAL						470,600

a/ Determined by multiplying the number of 1973 infested trees by the buildup ratio.

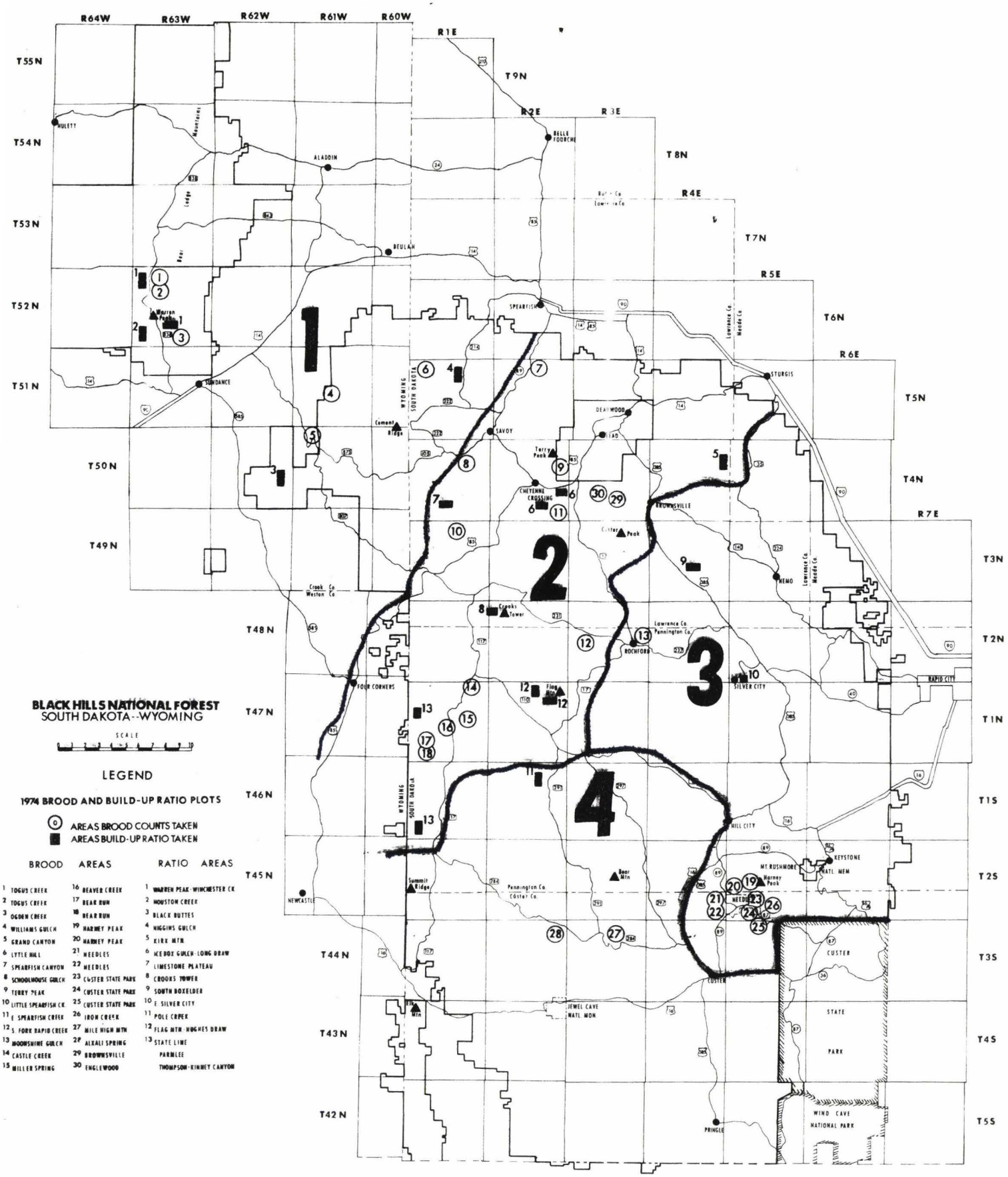
R64W
R63W
R62W
R61W
R60W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
T55N
T54N
T53N
T52N
T51N
T50N
T49N
T48N
T47N
T46N
T45N
T44N
T43N
T42N
T9N
T8N
T7N
T6N
T5N
T4N
T3N
T2N
T1N
T1S
T2S
T3S
T4S
T5S
HULETT
ALADDIN
BELLE FOURCHE
BEULAH
SPEARFISH
STURGIS
SUNDANCE
DEADWOOD
SAVOY
CEMENT RIDGE
TERRY PEAK
CHEYENNE CROSSING
BROWNSVILLE
CUSTER PEAK
MEMO
CROOKS TOWER
ROCKFORD
SILVER CITY
FOUR CORNERS
FLAG MTN
RAPID CITY
HILL CITY
KEYSTONE
MT RUSHMORE NATL MEM
MT. RUSHMORE
NEEDLES
SUMMIT RIDGE
BEAR MTN
NEWCASTLE
CUSTER
STATE PARK
JEWEL CAVE NATL MON
PRINGLE
WIND CAVE NATIONAL PARK
WYOMING
SOUTH DAKOTA
Warren Peak
Harney Peak
Terry Peak
Crooks Tower
Flag Mtn
Summit Ridge
Bear Mtn
Crook Co
Weston Co
Lawrence Co
Pennington Co
Custer Co
Meade Co
1
2
3
4
5
6
7
8
9
10
11
12
13
BLACK HILLS NATIONAL FOREST
SOUTH DAKOTA--WYOMING
SCALE
LEGEND
1974 BROOD AND BUILD-UP RATIO PLOTS
AREAS BROOD COUNTS TAKEN
AREAS BUILD-UP RATIO TAKEN
BROOD AREAS
1 TOGUS CREEK
2 TOGUS CREEK
3 OGDEN CREEK
4 WILLIAMS GULCH
5 GRAND CANYON
6 LYTLE HILL
7 SPEARFISH CANYON
8 SCHOOLHOUSE GULCH
9 TERRY PEAK
10 LITTLE SPEARFISH CK
11 E SPEARFISH CREEK
12 S FORK RAPID CREEK
13 MOONSHINE GULCH
14 CASTLE CREEK
15 MILLER SPRING
16 BEAVER CREEK
17 BEAR RUN
18 BEAR RUN
19 HARNEY PEAK
20 HARNEY PEAK
21 NEEDLES
22 NEEDLES
23 CUSTER STATE PARK
24 CUSTER STATE PARK
25 CUSTER STATE PARK
26 IRON CREEK
27 MILE HIGH MTN
28 ALKALI SPRING
29 BROWNSVILLE
30 ENGLEWOOD
RATIO AREAS
1 WARREN PEAK-WINCHESTER CK
2 HOUSTON CREEK
3 BLACK BUTTES
4 HIGGINS GULCH
5 KIRK MTN
6 ICE BOX GULCH-LONG DRAW
7 LIMESTONE PLATEAU
8 CROOKS TOWER
9 SOUTH BOXELDER
10 E SILVER CITY
11 POLE CREEK
12 FLAG MTN-HUGHES DRAW
13 STATE LINE
PARMLEE
THOMPSON-KINNEY CANYON

FIGURE 1

The present emphasis on suppression is salvage logging of currently infested trees. This is the most desirable suppression method. Industry, however, is limited in the number of trees they can utilize. In 1973 there was 348,000 infested trees removed by logging. This years aerial survey indicated that approximately 270,000 1973 infested trees were left standing for various reasons.

As of November 6, 1974, the Forest had sold 192,000 1974 infested trees. With present funding they can sell an additional 31,800 trees. Industry has indicated they might be able to harvest an additional 154,600 trees. If they can handle the additional trees there will be at least 91,000 remaining infested trees.

CONCLUSION

The major emphasis on suppression should continue to be salvage logging. Chemical or burning treatments are an alternative for those trees that cannot be logged. The primary trees to be treated by an alternate method should be those remaining in the salvage logged areas in order to have a complete treatment. Alternate suppression methods would also be desirable in high value areas.

Salvage logging only extends the inevitable. The Forest has a long history of losses to the mountain pine beetle. These losses occur in areas where the basal area exceeds 150 $ft.^2$. Future losses could be lowered to a tolerable level with increased stand management. In order to accomplish this there would have to be an increase in the funding, the annual allowable cut and the capacity of local industry. Expenditures for stand management will give a greater return on the investment than beetle suppression projects.